

--42. A multi-utility energy control and facility management system for monitoring consumption, and cost of resource generation, for a plurality of different utility types with a single master meter and for monitoring and controlling individual utility systems within a facility, for determining possible utility cost adjustments to enhance cost effectiveness, which comprises:

(a) at least one central control computer being connected to a multi-utility master meter device, said at least one central control computer having sufficient software adapted to receive utility consumption rate data from said master meter and for storing, presenting, analyzing and reporting from said data sufficient information to monitor consumption rates and to compare such information to theoretical and/or historical data to identify unexpected changes in consumption and to identify peak demands, surges and sags, said computer also being connected to a plurality of individual utility consuming systems within a facility, said software also being adapted to control said utility consuming systems by adjusting actual utility consumption in response to predetermined parameters set for each of said utility consuming systems, said software further including at least one dashboard screen and a plurality of utility subscreens relating thereto, said at least one dashboard screen including one which provides a plurality of utility type icons for selection of a utility from said icons, and at least two

interface gateways, each being adapted for communications with at least one network for selection of utility-facilities operations related data, and said software further including a plurality of subscreens for presenting (i) said selectable utility information from said utility type icons and (ii) selectable utility-facility operations related data from said at least two interface gateways;

(b) a multi-utility real time master meter for monitoring consumption of a plurality of different utility types with a single master meter, which includes a central processing unit, visual display means connected to the central processing unit, programming controls, a power source connection and a plurality of meter sensor connections; and,

(c) a plurality of utility meter sensors connected to said master meter, at least a portion of said utility meter sensors being retrofit sensors attachable to existing utility meters for sensing real time rates from said existing utility meters, and transmitting said real time rates to said central processing unit, said plurality of utility meter sensors including utility meter sensors having means to sense real time rates from electromechanical utility meters which are attachable to conventional utility meters.

43. The system of claim 42 wherein said dashboard screen includes icons for at least two utilities selected from the group

consisting of electric, oil, gas, water and steam.

44. The system of claim 42 wherein said at least two interface gateways include selection indicia for screens for at least fire and sprinkler system, power quality, electrical and lighting.

45. The system of claim 42 wherein said multi-utility real time master meter central processing unit includes means for receiving real time utility meter consumption rates data from said sensors, means for storing said data, means for presenting said data on display via said visual display means in accordance with a preprogrammed sequence and in preprogrammed time frames, means for converting said data to averages over longer periods of time based on preprogrammed parameters, and means for presenting both real time consumption rate data and converted data to a computer in a predetermined computer language format.

46. The system of claim 42 wherein at least one of said sensors is wired directly to said master meter central processing unit

within said housing.

47. The system of claim 42 wherein at least one of said sensors is wired to a signal transmission device for transmitting signals through an alternating current line to said master meter central processing unit and said master meter central processing unit includes a receiver for receiving said signals from said alternating current line and inputting said signals to said master meter central processing unit.

48. The system of claim 42 wherein at least a portion of said meter sensors are current transformers which transmit from about 0 to about 5 milliamps to measure electricity characteristics.

49. The system of claim 42 wherein said at least one central control computer contains software adapted to receive and update alternative utility company competitive pricing information.

50. The system of claim 49 wherein said central control computer

software is adapted to provide short term utility contracts for purchase of alternative utility company competitively priced utilities.

51. The system of claim 42 wherein said master meter includes a main housing which is physically separate from said at least one central control computer.

52. The system of claim 42 wherein said plurality of utility subscreens includes at least a portion of said subscreens having specific real time utility data and at least a portion of said subscreens having the same utility type icons as said dashboard screen to provide interconnection capability from utility to utility.

53. The system of claim 42 wherein a plurality of operational efficiency sensors, strategically located throughout the facility, are connected to said central computer to provide data for said facility management including the heating ventilating

and air conditioning (HVAC) system performance, personnel ingress and egress, personnel occupancy in various areas of said facility, mechanical equipment operation and efficiency, sales, productivity, facility security, and existence of emergency situations such as fire, loss of environmental control, environmental hazards, and interruption of electric power or water service.

54. The system of claim 42 wherein said at least three said interface gateways are included in said dashboard to be used for said facility management, and include said selection indicia for screens for a demand side center, a supply side center, and systems operation center.

55. The system of claim 42 wherein said central computer has sufficient software adapted to receive data from said master utility meter, said operational efficiency sensors, and said utility cost and availability data, and to analyze said sensor

data and said utility cost and availability data to provide information for said facility management to improve productivity and reduce operating costs including managing personnel placement and quantity in said facility and controlling personnel productivity.

56. The system of claim 42 wherein said central computer has sufficient software adapted to receive data from said master utility meter, said operational efficiency sensors, and said utility cost and availability data, and to analyze said sensor data and said utility cost and availability data to provide information for said facility management to improve productivity and reduce operating costs including:

(d) tracking real time power usage and load factor and managing said facility power usage to reallocate power usage to less costly off peak times of day, and receiving electric power cost data from external sources allowing purchase of electric power at lowest cost:

(e) obtaining data for deriving lowest fuel cost based on demand and supply;

(f) regulating water usage by said facility to avoid excess usage;

(g) regulating said HVAC usage and monitoring the condition of said HVAC system to permit adequate maintenance and repair;

(h) monitoring and regulating indoor atmosphere and reacting to unhealthy atmospheric conditions;

(i) monitoring the security of said facility;

(j) operating emergency control systems.

57. The system of claim 42 wherein said software further includes a plurality of multi-site consolidation screens and supporting software to enable a user to coordinate utility information and facility management for multiple locations in real time.

58. A multi-utility energy control and facility management

system for monitoring consumption of a plurality of different utility types with a single master meter and for monitoring and controlling individual utility systems within a facility, which comprises:

(a) at least one central control computer being connected to a multi-utility master meter device, said at least one central control computer having sufficient software adapted to receive utility consumption rate data from said master meter and for storing, presenting, analyzing and reporting from said data sufficient information to monitor consumption rates and to compare such information to theoretical and/or historical data to identify unexpected changes in consumption and to identify peak demands, surges and sags, said computer also being connected to a plurality of individual utility consuming systems within a facility, said software also being adapted to control said utility consuming systems by adjusting actual utility consumption in response to predetermined parameters set for each of said utility consuming systems, said software further including at

least one dashboard screen and a plurality of utility subscreens relating thereto, said at least one dashboard screen including one which provides a plurality of utility type icons for selection of a utility from said icons, and at least two interface gateways, each being adapted for communications with at least one network for selection of utility-facilities operations related data, and said software further including a plurality of subscreens for presenting (i) said selectable utility information from said utility type icons and (ii) selectable utility-facility operations related data from said at least two interface gateways;

(b) a multi-utility real time master meter for monitoring consumption of a plurality of different utility types with a single master meter, which includes a central processing unit, visual display means connected to the central processing unit, programming controls, a power source connection and a plurality of meter sensor connections; and,

(c) a plurality of utility meter sensors connected to said

master meter, at least a portion of said utility meter sensors being integrally connected to utility meters for sensing real time rates from said utility meters, and transmitting said real time rates to said central processing unit, said plurality of utility meter sensors including utility meter sensors having means to sense real time rates from electromechanical utility meters which are attachable to outside surfaces of electromechanical utility meters by measuring magnetic flux caused by motion within said electromechanical utility meters as said electromechanical utility meters move during consumption.

59. The system of claim 58 wherein said dashboard screen includes icons for at least two utilities selected from the group consisting of electric, oil, gas, water and steam.

60. The system of claim 58 wherein said at least two interface gateways include selection indicia for screens for at least fire and sprinkler system, power quality, electrical and lighting.

61. The system of claim 58 wherein said master meter central processing unit includes means for receiving real time utility meter consumption rates data from said sensors, means for storing said data, means for presenting said data on display via said visual display means in accordance with a preprogrammed sequence and in preprogrammed time frames, means for converting said data to averages over longer periods of time based on preprogrammed parameters, and means for presenting both real time consumption rate data and converted data to a computer in a predetermined computer language format.

62. The system of claim 58 wherein at least one of said sensors is wired directly to said central processing unit within said housing.

63. The system of claim 58 wherein at least one of said sensors is wired to a signal transmission device for transmitting signals through an alternating current line to said central processing

unit and said central processing unit includes a receiver for receiving said signals from said alternating current line and inputting said signals to the central processing unit.

64. The system of claim 58 wherein at least a portion of said utility meter sensors are located within said utility meters.

65. The system of claim 58 wherein said at least one central control computer contains software adapted to receive and update alternative utility company competitive pricing information.

66. The system of claim 65 wherein said central control computer software is adapted to provide short term utility contracts for purchase of alternative utility company competitively priced utilities.

67. The system of claim 58 wherein said master meter includes a main housing which is physically separate from said at least one central control computer.

68. The system of claim 58 wherein said plurality of utility subscreens includes at least a portion of said subscreens having specific real time utility data and at least a portion of said subscreens having the same utility type icons as said dashboard screen to provide interconnection capability from utility to utility.

69. The system of claim 58 wherein a plurality of operational efficiency sensors, strategically located throughout the facility, are connected to said central computer to provide data for said facility management including said HVAC system performance, personnel ingress and egress, personnel occupancy in various areas of said facility, mechanical equipment operation and efficiency, sales, productivity, facility security, and existence of emergency situations such as fire, loss of environmental control, environmental hazards, and interruption of electric power or water service.

70. The system of claim 58 wherein said at least three said interface gateways are included in said dashboard to be used for said facility management, and include said selection indicia for screens for a demand side center, a supply side center, and systems operation center.

71. The system of claim 58 wherein said central computer has sufficient software adapted to receive data from said master utility meter, said operational efficiency sensors, and said utility cost and availability data, and to analyze said sensor data and said utility cost and availability data to provide information for said facility management to improve productivity and reduce operating costs including managing personnel placement and quantity in said facility and controlling personnel productivity.

72. The system of claim 58 wherein said central computer has sufficient software adapted to receive data from said master

utility meter, said operational efficiency sensors, and said utility cost and availability data, and to analyze said sensor data and said utility cost and availability data to provide information for said facility management to improve productivity and reduce operating costs including:

(d) tracking real time power usage and load factor and managing said facility power usage to reallocate power usage to less costly off peak times of day, and receiving electric power cost data from external sources allowing purchase of electric power at lowest cost:

(e) obtaining data for deriving lowest fuel cost based on demand and supply;

(f) regulating water usage by said facility to avoid excess usage;

(g) regulating said HVAC usage and monitoring the condition of said HVAC system to permit adequate maintenance and repair;

(h) monitoring and regulating indoor atmosphere and reacting to unhealthy atmospheric conditions;

(i) monitoring the security of said facility;

(j) operating emergency control systems.

73. The system of claim 58 wherein said software further includes a plurality of multi-site consolidation screens and supporting software to enable a user to coordinate utility information for multiple locations in real time as well as aggregate load demand for regions.

74. In a system for multi-utility energy control for monitoring consumption, and cost of resource regeneration, for a plurality of different utility types with a single master meter, and for monitoring and controlling individual utility systems within a facility, which system includes a central control computer and sensing meters, said system having software to receive utility consumption rate data and to store, present and analyze report and adjust and control utility consumption, said software including a main screen and subscreens, which comprise:

(a) a dashboard screen having a plurality of utility type icons for selection of a utility from said icons and at least two interface gateways for selection of utility-facility operations related data; and,

(b) a plurality of subscreens for presenting (i) said selectable utility information from said utility type icons and (ii) selectable utility related data from said interface gateway.

75. The system of claim 74 wherein said dashboard screen includes icons for at least two utilities selected from the group consisting of electric, oil, gas, water and steam.

76. The system of claim 74 wherein said at least two interface gateways include selection indicia for screens for modules for at least fire and sprinkler system, power quality, electrical and lighting.

77. The system of claim 74 wherein said software further

includes a plurality of multi-site consolidation screens and supporting software to enable a user to consolidate and coordinate utility information for multiple locations in real time as well as aggregate load demand for regions.ghing.

78. The system of claim 74 wherein said at least two interface gateways include selection indicia for a screen for a supply side management center, a facility management center and a demand center.

79. The system of claim 74 wherein a plurality of operational efficiency sensors, strategically located throughout the facility, are connected to said central computer to provide data for said facility management including said HVAC system performance, personnel ingress and egress, personnel occupancy in various areas of said facility, mechanical equipment operation and efficiency, sales, productivity, facility security, and existence of emergency situations such as fire, loss of

environmental control, environmental hazards, and interruption of electric power or water service.

80. The system of claim 74 wherein said at least three said interface gateways are included in said dashboard to be used for said facility management, and include said selection indicia for screens for a demand side center, a supply side center, and systems operation center.

81. The system of claim 74 wherein said central computer has sufficient software adapted to receive data from said master utility meter, said operational efficiency sensors, and said utility cost and availability data, and to analyze said sensor data and said utility cost and availability data to provide information for said facility management to improve productivity and reduce operating costs including managing personnel placement and quantity in said facility and controlling personnel productivity.

82. The system of claim 74 wherein said central computer has sufficient software adapted to receive data from said master utility meter, said operational efficiency sensors, and said utility cost and availability data, and to analyze said sensor data and said utility cost and availability data to provide information for said facility management to improve productivity and reduce operating costs including:

(d) tracking real time power usage and load factor and managing said facility power usage to reallocate power usage to less costly off peak times of day, and receiving electric power cost data from external sources allowing purchase of electric power at lowest cost:

(e) obtaining data for deriving lowest fuel cost based on demand and supply;

(f) regulating water usage by said facility to avoid excess usage;

(g) regulating said HVAC usage and monitoring the condition of said HVAC system to permit adequate maintenance and repair;

(h) monitoring and regulating indoor atmosphere and
reacting to unhealthy atmospheric conditions;

(i) monitoring the security of said facility;

(j) operating emergency control systems.--